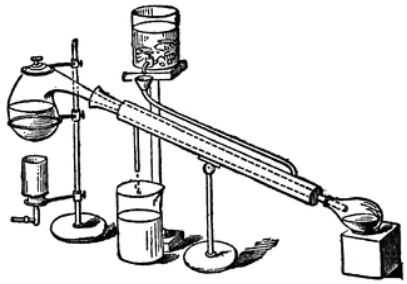
SOUTHWEST RETORT



SIXTY-EIGHTH YEAR **MARCH 2016**

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and Chemistry in this area

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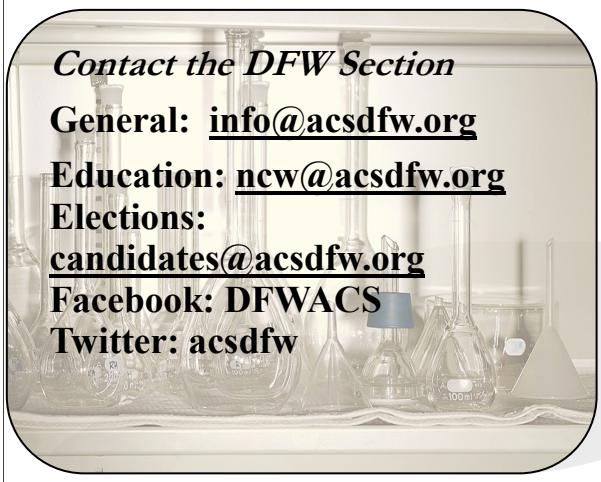

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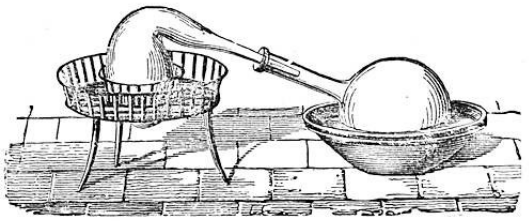

Appareil simple de distillation.

oldbookillustrations.com

EMPLOYMENT CLEARING HOUSE

Job applicants should send name, email, and phone, along with type of position and geographical area desired; employers may contact job applicants directly. If you have an opening, send your listing, including contact info for your company, to retort@acsdfw.org. Deadlines are the 7th of each month.

JENKEM TECHNOLOGY

The PEG and PEGylation Technology People

Job Title: Sales/Marketing Assistant

Name of Company: JenKem Technology USA Inc.

Nature of Business: Polyethylene Glycol (PEG) Polymers for Pharmaceutical and Biotech Applications

Job ID: JKUSA-20150501

Job Type: Full-time

Salary Range: Base salary $25,000.00 to $35,000.00; plus Sales Commission

Location: United States - Texas – Plano

Additional notes: Must be legally authorized to work in the United States. Local candidates preferred, no relocation benefits are provided for the position.

Job Functions: Sales and marketing for PEGylation products and services: provides quotations and information on product availability, and provides answers to technical questions to customers, by phone or email; processes orders, shipping, and payments; develops and maintains customer relationships; identifies and develops new customers and new markets for PEGylation products and services; and performs other tasks as assigned by the manager.

Job Requirements: Bachelor's degree or higher (Chemistry/Biology/Biochemistry or similar background REQUIRED); Excellent interpersonal and communication skills; Excellent reading, speaking, and writing skills in business English; Good arithmetic skills and attention to details required; Proficiency in the use of Microsoft Word, Excel, PowerPoint, and Outlook required; English/Chinese bilingual preferred; Ability to work independently required.

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FIFTY YEARS AGO IN THE SOUTHWEST RETORT

The ACS tour speakers for March were **Dr. Wayne L. Carrick of** Union Carbide, whose topic was "Organo Transition Metal Compounds in Catalysis" and **Dr. Howard V. Malmstadt** of the University of Illinois, whose topic was "Electronic Instrumentation for Chemists."

Fisher Scientific Co. has produced a new stirrer called the Dyna-Mix, which is engineered to provide high torque through its adjustable range from 0 to 6000 rpm. Varian Aerograph has brought out two new instruments. The Aerograph Hy-FI III is a low cost gas chromatography using ionization detectors.

Dr. Peter R. Girardot joined the faculty of Arlington State College (*now UT-Arlington*) as Professor of Chemistry. He received his Ph.D. from the University of Michigan in 1952. He comes from the Chemical Division of Pittsburgh Plate Glass Co., where he was Senior Supervisor, Exploratory Inorganic Research. Much of his work has been carried out on boron compounds and chlorine compounds. He is currently on the Editorial Board of the *Journal of the American Chemical Society*.

Forty-six high temperature scientists from throughout the US met in January at Rice University to discuss "Current and Future Problems of High Temperature Chemistry." Rice faculty members **John Margrave** and **J. L. Franklin** gave seminars at Purdue and LSU-New Orleans, respectively. Also in the ACS Southeastern Section, the Sixth Hydrocarbon Symposium will be held April 13-14 at the Sheraton-Lincoln Hotel in Houston. The banquet on April 13 will feature **Dr. Norman Hackerman** as guest speaker. Dr. Hackerman is Vice-Chancellor for Academic Affairs at the University of Texas. His talk will deal with "The Public University, 1966."

At Texas Tech, **Dr. H. J. Shine** has received a two-year, $63,000 Air Force grant to study "Ion Radicals of Organic Sulfur, Selenium, Tellurium, and Phosphorus Compounds." **Dr. W. N. Lipscomb** of Harvard gave a January seminar on "Polyhedral Molecules: Boranes and Carboranes." Faculty member **Dr. W. W. Wendlandt** has accepted the position of Chairman of the Chemistry Department at the University of Houston effective September, 1966.

Baylor faculty member **Dr. W. O. Milligan** was a West Coast ACS Lecturer in February. His topics were "Electron Microscopic Studies on Finely Divided Colloidal Particles" and "Adsorption Equations." He also met with California state legislators in Davis, CA, to discuss research and education.

Compiled by E. Thomas Strom

Building Climate Computer Models

By

John E. Spessard, PhD, PE

There are 39 groups in the world conducting climate research. There are about 60 climate models. The models have a great deal of commonality. It is accepted practice in computer programming to use existing code to the fullest extent possible. It is cheaper, faster, convenient and has already been debugged. (Remember Windows XP and 7?)

The Global Circulation Model (GCM) is the Cadillac of climate models. These three-dimensional models typically have grids with a horizontal resolution of between 250 and 600 kilometers. Some grids are square but most are non-rectangular to reflect the lessening of the earth's circumference at higher latitudes. There will also be ten to 30 levels of altitude, about 30 levels of the ocean and varying times when movements take place from each grid. There are also Atmospheric General Circulation Models that consider only the atmosphere, Ocean General Circulation Models that consider only the oceans and Regional General Circulation Models that cover a specific area. The GCM combines these approaches. Each slot in the grid may contain up to 30 variables. Every movement from grid to grid requires a new set of calculations. If the movements are more frequent the model is more reliable but the supercomputer time requirements are greater.

Every grid must have all of the variables accounted for. The United States and Europe have good climate data. Other areas such as much of Africa, the Middle East, the Arctic and the oceans off shipping lanes have limited surface and atmospheric data. Satellites are a help. But assumptions and approximations are necessary. These assumptions and approximations are verified and refined by achieving good fits with known climates based upon CO_2 levels.

The World Metrological Organization, a UN agency, has estimated that a model with 100 kilometer horizontal resolution, 20 vertical levels and a time-step of 10 to 20 minutes for a one-year simulation would need to process the data for each of the 2.5 million grid points more than 27,000 times. A 50-year projection of this model can require several months of supercomputer time. This does limit the ability for a model to project 50 or more years in both the past and present. For the past there would be data limitations. For that time range, the grids must be larger and the time-steps longer to achieve results in a tolerable time frame. This renders a limit of time frames to about 15 years.

A model is verified by the ability to fit the past climate based on the assumption that CO_2 is the only driver of climate. I can accept that the earth is warmer than it has been. Eric the Red settled Greenland in 946 CE and for 200 years they grew enough crops to feed themselves. The August 2014 issue of the National Geographic published two articles. One was on the effect of climate change (warmer) on Franz Josef Land. The other was on the Orkney Islands (north of Scotland) about having fertile soil, a mild climate (unlike now) and an advanced society for its time 5,000 years ago. These events are pre-industrial age. It makes me wonder if there could be influences on climate in addition to CO_2.

The models require the simplification of assuming uniformity within a grid point. At 250 kilometers or 150 miles on a side, I wonder about the effect of this assumption for areas with variable terrain and climate such as New Mexico, Arizona and Colorado. The models carry many other simplifications and assumptions. If nothing else, a driving factor is supercomputer time, expense and availability.

All of us are familiar with weather mathematical models. The methodology is the same for climate and weather models. The reader can make his/her decisions as to the reliability of weather models. Weather forecasting is much improved over when I was much younger. The weather models have advantages over the climate models:

1. Grid spacing for the weather models are smaller, about 50 kilometers on a side.
2. For the USA and relevant parts of oceans, Canada and Mexico, the available weather data is much more complete than many parts of the world.
3. The weather models provide much faster feedback and are easier to fine-tune, which improves the results.

Send your seminar schedules for the semester or the year to the Southwest RETORT!

retort@acsdfw.org

49th Annual Meeting-in-Miniature

Saturday, April 23, 2016

April 2016 Meeting
Dallas-Fort Worth Section
of the
American Chemical Society

TWU
TEXAS WOMAN'S UNIVERSITY
DENTON DALLAS HOUSTON

Texas Woman's University
Ann Stuart Science Complex, Denton Texas

Call **for Abstracts:** All **Graduate and Undergraduate Students** are invited to **submit** abstracts for **a 10-12 minute** oral **presentation, allowing** 3-5 minutes for **questions.**

Abstract Deadline: Thursday March 31, 2016

Submission: Use the format below to email your ACS-style abstract to twu.mim2016@gmail.com **with** the subject line, "Meeting in **Miniature Abstract** Submission" (format **below).**

Awards: Multiple Awards given to **top presentations** from each session.

Registration: Free!

Abstract Details:

Title of Presentation
Authors: Underline presenting author and put an * next to advisor
Affiliation (Department and University) Division: (Analytical, Biochemistry, Inorganic, Organic, Physical, etc. There is no limit to division participants.)
Email address of presenting author
Category: Undergraduate or Graduate
Abstract: Paragraph, which should include "Motivation, Methods, Results,Conclusions" – C. Elliot; and be limited to 200 words

Tentative Schedule:

8:00-8:30	Check-In
8:30-10:00	Oral Presentation
10:00-10:15	Morning Break
10:15-11:45	Oral Presentations
11:45- 12:45	Lunch Break
1:00 - 3:00	Oral Presentations
3:00 – 3:30	Tours and Reception
3:30	Awards Ceremony

TWU Denton Campus:
http://www.twu.edu/maps/denton-campus-map/

Visitors may park in lot 65 or any surrounding parking lots for FREE on Saturday

From the ACS Press Room

Hair forensics could yield false positives for cocaine use

Consequences of Decontamination Procedures in Forensic Hair Analysis Using Metal-Assisted Secondary Ion Mass Spectrometry Analysis

Analytical Chemistry

Hair analysis has become standard practice for determining whether someone has abused illicit drugs. But some experts have questioned whether current methods to wash away external contaminants from samples might affect test results. Now one team confirms that for cocaine detection, a pretreatment step can cause the drug on the outside of a hair shaft to wash into it and potentially lead to falsely identifying someone as a drug user. Their study appears in ACS' journal *Analytical Chemistry.*

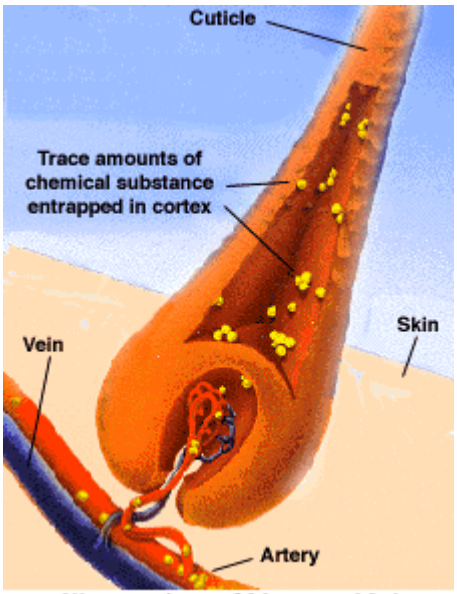

Illustration of Human Hair

Testing a person's locks for evidence of drug abuse has several advantages over urine and blood analyses. Sampling is simple and non-invasive. And a person's hair provides a record of use over a long period, whereas body fluids can only provide a short-term picture. However, it can be difficult to distinguish drugs incorporated into hair because someone has taken them from drugs that externally contaminate a non-user's hair when he or she was in the same room as the substances. To address this uncertainty, testers wash hair samples to get rid of any potential external contaminants. Eva Cuypers and colleagues wanted to find out if this step could affect the results.

The researchers followed standard procedures to wash off cocaine from non-users' hair. They then examined cross-sections of these samples and found that the drug had migrated into the hair shafts. The results suggest that current methods to decontaminate hair can have the opposite effect. The researchers conclude that this new insight could have implications for future hair analyses.

The authors acknowledge funding from the Netherlands Organization for Scientific Research (NWO) and Fonds Wetenschappelijk Onderzoek.

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...And Another Thing…

by Denise L. Merkle, PhD

Lies of the Bogeyman

There's a monster in the closet or under the bed. Maybe it's lurking on the roof, preparing to slither down the chimney and wreak havoc. Eeeek! Who hasn't had an irrational fear - or two? Pixar/Disney made a fortune off why-we-sleep-with-the-lights-on. According to Box Office Mojo[1], Monsters, Inc. cost $115M to make, and grossed more than $255M. Since releasing the movie in November 2001, the studio has made than $140 million dollars off of being afraid of the dark. The premise of the flick is that Monsters emerge from closets and scare children to generate power for their city, Monstropolis. Significantly, by the end of the movie it has been discovered that laughing children generate more energy than screaming children. Reaching this conclusion, of course, involves 90 minutes of a toddler, a couple monsterifications of evil, and tortuous monsterial hijinks, but the nighttime closet dwellers finally achieve enlightenment and fear is banished.

Not so with the monstrous behaviors to which the American people are currently being incited. Did an entire group of potential voters actually pledge their support to a candidate, and use Nazi salutes to do it?[2] Yes, yes they did. Were the fans of a high school sports team inspired to shout rude comments, spurred by of a divisive candidate's assertions, to taunt an opposing team that was of a different racial makeuo?[3] Yes, that too. What about immigration? Amazingly enough, the wild rhetoric bandied about in public has revealed to a swath of society that feels the majority of people who wish to pursue a better life in the USA are criminals, bent on destroying our democracy, and that those who risk their lives escaping the military actions that destroyed their livelihoods are unworthy of assistance. Are we the current version of Van Diemanns Land? Should we send all our debtors to Georgia?[4]

Who knows if The Frightened are playing Devil's Advocate, or if they actually believe that there are terrifying threats inherent in Islam, refugees, immigrants, science, voting, other races, genders, zombies... If you can name a topic, there is someone instigating fear of it, often for the purpose of advancing personal agendas, and possibly in order to see how far past decency people can be encouraged to go. The provocation to Fear is here. For a number of people, this means that the door to intolerance that had been painstakingly inched shut has been burst wide open.

Acceptance of the idea that (loudly) speaking one's mind is a positive quality that supersedes the need for compassion, knowledge of history, and even some grasp of world religions isn't indicative of a populace that embraces honesty and forthright conversation. It's a sign that there's a lot of hatred around, and that it doesn't take much to induce fear in those who choose to suspend their intelligence in pursuit of security and protection from the monsters.

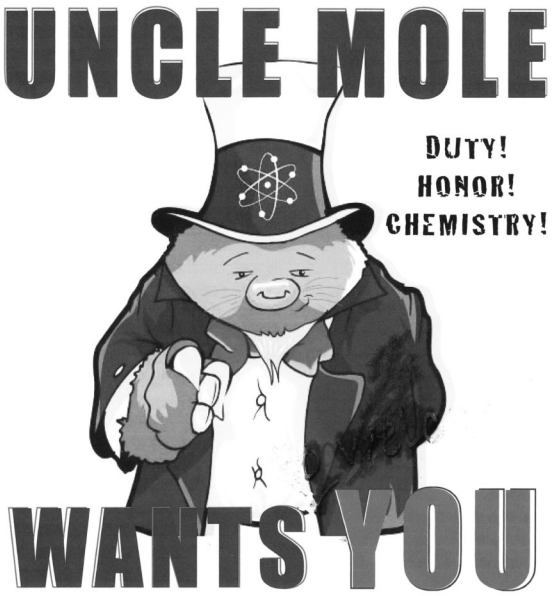
What is the point of all this, you may ask? The point is it is easier to control others with fear than with almost anything else. Possibly only hunger is a greater impetus for compliance. The monsters under the bed are make-believe, but those who promote hatred are real - and they're among us. Focus on quelling the hate-mongers, and the monsters will dissolve too.

[1]http://www.boxofficemojo.com/movies/?id=monstersinc.htm

[2]http://www.huffingtonpost.com/entry/donald-trump-right-hand-salute_us_56db50d8e4b03a405678e27a

[3]http://www.usnews.com/news/articles/2016-02-29/bishop-denounces-trump-chants-at-high-school-basketball-game

[4]http://www.history.com/topics/us-states/georgia



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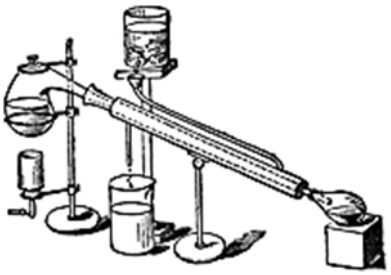


From the ACS Press Room

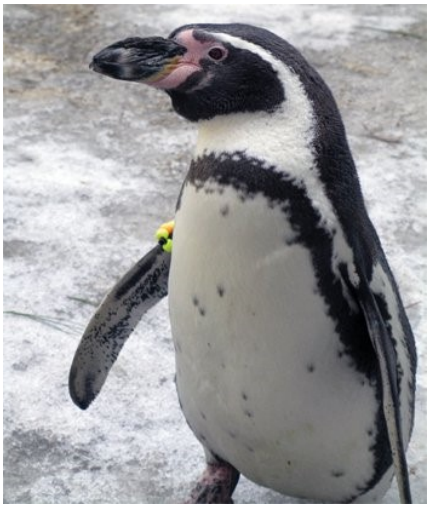
What makes penguin feathers ice-proof?

Icephobicity of Penguins Spheniscus Humboldti and an Artificial Replica of Penguin Feather with Air-Infused Hierarchical Rough Structures

Journal of Physical Chemistry C

Humboldt penguins live in places that dip below freezing in the winter, and despite getting wet, their feathers stay sleek and free of ice. Scientists have now figured out what could make that possible. They report in ACS' *Journal of Physical Chemistry C* that the key is in the microstructure of penguins' feathers. Based on their findings, the scientists replicated the architecture in a nanofiber membrane that could be developed into an ice-proof material.

The range of Humboldt penguins extends from coastal Peru to the tip of southern Chile. Some of these areas can get frigid, and the water the birds swim in is part of a cold ocean current that sweeps up the coast from the Antarctic. Their feathers keep them both warm and ice-free. Scientists had suspected that penguin feathers' ability to easily repel water explained why ice doesn't accumulate on them: Water would slide off before freezing. But research has found that under high humidity or ultra-low temperatures, ice can stick to even superhydrophobic surfaces. So Jingming Wang and colleagues sought another explanation.



The researchers closely examined Humboldt penguin feathers using a scanning electron microscope. They found that the feathers were comprised of a network of barbs, wrinkled barbules and tiny interlocking hooks. In addition to being hydrophobic, this hierarchical architecture with grooved structures is anti-adhesive. Testing showed ice wouldn't stick to it. Mimicking the feathers' microstructure, the researchers developed an icephobic polyimide fiber membrane. They say it could potentially be used in applications such as electrical insulation.

The authors acknowledge funding from the National Research Fund for Fundamental Key Projects, the National Natural Science Foundation, the Chinese Academy of Sciences, the 111 Project and the Beijing Higher Education Young Elite Teacher Project.

Around the Area

UTA

Research carried out by chemistry faculty member **Fred MacDonnell**, students **Wilaiwan Chanmanee** and **Mohammad Islam**, and engineering faculty member **Brian Dennis** and published in the *Proceedings of the National Academy of Science* has received substantial coverage recently. It was the focus of a piece in the Feb. 29 issue of *C&EN*, was also covered in *The Chemical Engineer and Science News*, and was noted in literally dozens of publications worldwide. The UTA group has carried out a reduction of carbon dioxide with sunlight and steam to produce liquid hydrocarbons and oxygen. The process essentially combines photochemical water-splitting with hydrocarbon synthesis in a manner similar to the Fischer-Tropsch synthesis.

In a related matter, Greenway Innovative Energy of Fort Worth has given UTA a $750,000 gift to establish the F. Conrad Greer Lab. **F. Conrad Greer**, recently retired from Greenway, was an internationally recognized petroleum engineer and chemist known for his important work in the oil and gas industry. This new lab will be used to further develop technologies related to the production of liquid hydrocarbon fuels including the discovery mentioned above.

UTD

The Department of Chemistry and Biochemistry and the Edith O'Donnell Institute of Art History welcome Professor **David McPhail** to UT-Dallas as the University's first Distinguished Chair of Conservation Science. Dr. McPhail is an expert in the field of ion beam mass spectrometry and is a two-time winner of the Imperial College Rector's Award for Teaching. Among these collaborative projects, he will be working with the Dallas Museum of Art to characterize the dyes used in Andean textiles and with the Amon Carter Museum to analyze materials used by the Mexican printmaker José Posada.

Professor **Ray Baughman**, the Robert A. Welch Distinguished Chair in Chemistry and Director of the Alan G. MacDiarmid NanoTech Institute, was named a Fellow of the National Academy of Inventors. Dr. Baughman has 72 issued US Patents ranging from vaccine potency indicators that have saved lives in the underdeveloped world to artificial muscles and carbon nanotube sheets and yarns that are being commercially developed by licensees such as Lintec of America in Richardson, Texas.

From the ACS Press Room

What gives parmesan cheese its unique taste?

Quantitation of Key Tastants and Re-engineering the Taste of Parmesan Cheese

Journal of Agricultural and Food Chemistry

When it comes to pasta and pizza dishes, nothing beats a sprinkle of grated parmesan on top. But the flavor quality of the popular cheese can be inconsistent. Now scientists are using "molecular food engineering" to help ensure its good taste. In a report in ACS' *Journal of Agricultural and Food Chemistry*, they identify key components that contribute to the cheese's signature flavor.

In recent years, the food and beverage industry has increasingly been turning to science to analyze products and come up with systematic ways to improve them. Some of these studies have been geared toward identifying components in cheeses that give them their savory blend of salty and bitter notes. But no one had thoroughly investigated parmesan's particular suite of tasty compounds. Hedda Hillmann and Thomas Hofmann from the Technical University of Munich, Germany, took on the challenge.

The researchers extracted the active, key taste compounds from samples of parmesan and identified 31 that were critical to the cheese's savory and bitter flavors. Several peptides were identified for the first time in parmesan and were found at high concentrations. The researchers say knowing this taste profile could help manufacturers tweak their processes to produce a better tasting cheese.

How is parmesan cheese made? (It takes a lot of milk!)

Watch here!

FIVE QUESTIONS FOR…

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From the ACS Press Room

How ocean acidification and warming could affect the culturing of pearls

Interactive Effects of Seawater Acidification and Elevated Temperature on the Transcriptome and Biomineralization in the Pearl Oyster Pinctada fucata

Environmental Science & Technology

Pearls have adorned the necklines of women throughout history, but some evidence suggests that the gems' future could be uncertain. Increasingly acidic seawater causes oyster shells to weaken, which doesn't bode well for the pearls forming within. But, as scientists report in ACS' journal *Environmental Science & Technology*, the mollusks might be more resilient to changing conditions than previously thought.

Pearl aquaculture is big business, particularly in Asia and Australia. But much of it takes place in oceans, which are susceptible to the increasing amounts of carbon dioxide human activity releases into the atmosphere. CO_2 from the air gets absorbed by the oceans, which become more acidic as a result. Research has found that pearl oysters produce weaker shells under these conditions, and this could hurt their chances of survival. But in addition to acidity, rising water temperature could also play a role in oyster health. Rongqing Zhang, Liping Xie and colleagues wanted to see how combining acidity and water temperature would affect pearl oysters.

The researchers tested oysters for two months under varying water temperature and pH conditions, including those predicted for oceans in 2100. Their results confirmed previous work that had found boosting acidity led to weaker shells, but that effect didn't occur when the water temperature was also higher. The researchers concluded that warmer oceans could buffer these valuable marine animals from increasingly acidic seawater.

The authors acknowledge funding from the National Natural Science Foundation of China and the China Postdoctoral Science Foundation.

From the editor

The 49th Meeting-in-Miniature of the DFW Section will be held at Texas Woman's University on April 23. Get your abstracts by March 29th...the experience of talking on your feet and having questions fired at you is vital to professional growth. This annual event of the DFW section provides an invaluable experience for both graduate and undergraduate students.

We're all aware that ocean acidification is a danger to many species of marine life, of all types, for various reasons. Higher pH can destroy gel casings on fish eggs. Coral is dissolved. Oyster and other mollusk shells are weaker, hurting their survival and ability to product pearls oysters...but wait. It turns out that while acidification weakens oyster shells, the higher temperatures of global warming actually act as a buffer for this effect, and the pearl-making oysters are not affected.

I am happy to learn that penguin feathers are ice-phobic, but there is still one thing I want to know. Do penguins have cold feet? Reading the press release made me think of that again. If you ask da Google, it turns out that penguins have evolved extra circulation in their feet to counteract the fact they must go barefoot in the Antarctic; sometimes they hunch over and cover their feet with their belly feathers to help in warming (I'm just not sure about that). I also found a suggestion that heat loss through their feet keeps them from overheating due to the excellent insulation provided by the feathers. Overheating, in the Antarctic? Really?

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